Space: The Evolving Importance of the Final Frontier

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The U.S. military's transformation to the post-Cold War era was convincingly demonstrated during Operations Enduring Freedom (OEF) and Iraqi Freedom (OIF). The initial phases of both operations, targeted at determined and capable enemy forces, were characterized by well-synchronized ground and air combat enabled by Space-based capabilities. The repressive regimes of the Taliban and Saddam Hussein were toppled with unparalleled speed and overwhelming military power.

OEF and OIF validated the great potential of advanced technology in the hands of trained professionals. Modern technology and joint operational concepts now routinely provide joint warfighters capabilities considered extraordinary just a few years ago. Foremost among these capabilities are those which harness Space technology and systems. Space-based systems enhance or enable a wide range of capabilities, including expeditious delivery of information, enhanced situational awareness, higher operational tempo, greater lethality, increased survivability and reduced planning times.

Analysis of the lessons from the initial phases of OEF and OIF is ongoing; however, three key points are resoundingly clear:

- The value of Space systems has been proven repeatedly in Afghanistan and Iraq
- Space must be part of military operational planning at the earliest opportunity
- Space-based capabilities must focus on support to the warfighter (Space to Mud)

Supporting the Current Fight: Keeping it Relevant

The 21st century is showing itself to be an era of uncertainty and unpredictability. Our nation's strategic environment is different than the past. Threats from adversaries and the missions our military are increasingly called on to perform are fundamentally changing. Ongoing combat operations in Afghanistan and Iraq also show that lightning assaults, Space-based technologies and precision strike capabilities alone are insufficient to defeat the current enemy. Compounding the challenge for our military forces are insurgent forces who attempt to blend into the local population, making it easier for them to elude advanced surveillance technology and precision strikes. As a result, the capabilities and the manner in which they were employed with such resounding success against the Taliban and Baathist regimes will need to evolve to defeat the asymmetric threats of the future.

Insurgent forces in Afghanistan and Iraq, waging asymmetric warfare, possess and employ a wide variety of irregular means in attempts to avoid our strengths and exploit our vulnerabilities. They have planted and detonated prolific numbers of technologically crude but deadly improvised explosive devices (IEDs). These IEDs have been extraordinarily varied in design and imaginative in their employment. In addition to coalition forces, the targets of these attacks have even been international institutions, noncombatants, individuals affiliated with nongovernmental charitable organizations and commercial companies involved in reconstruction. Shoulder-fired rocket propelled grenades, explosive-laden vehicles, suicide bombers and insurgents fighting tenaciously house-to-house have added additional risk and complexity for the coalition forces.

In an insurgent environment, one might believe that Space is irrelevant. Nothing could be further from the truth. The relevance of Space is important and its significance continues to grow. However, focus, adaptiveness and innovation are required to ensure Space-based systems and products remain relevant to the current fight. The goal of providing relevant support to our warfighters is to furnish them capabilities necessary to

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The 21st century is showing itself to be an era of uncertainty and unpredictability. Our nation's strategic environment is different than the past. Threats from adversaries and the missions our military are increasingly called on to perform are fundamentally changing.

keep pressure on enemy forces. Achievement of this goal will require our emphasis in four areas:

Support must be responsive and assured to the warfighter on the ground.

Warfighters need immediate access to actionable information. However, as observed by GEN James E. Cartwright, Commander, U.S. Strategic Command, "Thanks to satellites, the military can gather information more quickly than high-level leaders can react to it." The result is that our ability to collect information has eclipsed our ability to process it into actionable information.

Warfighters often encounter data-overload, making it a challenge for them to identify what they need to know. In this regard, two points are relevant: "Shared information does not automatically, if ever, lead to shared understanding" and "Higher quality information does not necessarily increase performance." An example was cited by an intelligence officer in an after action report from OIF: "Intelligence sections at all levels were inundated with information and data that had little bearing on their mission or intelligence requirements. Information was not disseminated based on a proactive evaluation of what supported commanders needed; it was just disseminated."

There are many variables in determining what information is valuable to commanders and planners. As a result, intelligence and Space professionals working with supporting agencies must strive to understand how warfighters will use selected information in different scenarios, and then proactively seek to support those information requirements. It is also important that relevant operational requirements for warfighters remain the primary focus of attention rather than the implementing architecture and its processes.

Support must be timely.

Support must be provided "in time" to be relevant to warfighters; support that arrives late serves as but a historical side note. For example, in preparation for possible combat operations prior to OIF, "in time" support was provided by Space and Missile Defense Battle Lab (subsequently reorganized as part of SMDC/ARSTRAT's new Future Warfare Center) in fielding applied technology in the form of the Space Support Element Toolset – Light for the Army Space Support Teams (ARSSTs). This capability enabled the rapid delivery of large data files to the ARSSTs without directly competing for the supported units' limited wideband communications assets.

Tremendous efforts are being expended to expedite delivery of the most relevant equipment to our warfighters. The Army Posture Statement notes, "Many technologies are already being fielded to our frontline Soldiers to dramatically improve their capabilities. Specific science and technology initiatives will improve existing capabilities to: detect and neutralize mines and improvised explosive devices; identify friendly forces in combat; identify hostile fire indicators; and enhance survivability, training systems and robotics."

In an effort to expedite relevant support, technologies and capabilities being developed in support of the future force are being leveraged to support current force requirements. For example, in July 2004, the Army restructured the Future Combat Systems (FCS) Program to accelerate delivery of crucial new capabilities to the Current Force. By accelerating FCS, promising technologies are being "spiraled" sooner than initially planned in support of Soldiers. Technological solutions like the Warlock, designed to interfere with IEDs detonated via electronic transmissions, are being initiated in direct response to warfighter requirements. The Army is aggressively implementing other similar initiatives in an effort to expedite technological solutions in support of our deployed warfighters:

- The Rapid Fielding Initiative (RFI) is designed to fill Soldier equipment shortfalls by quickly fielding commercial off-the-shelf technology rather than waiting for standard acquisition programs to address these shortages.
- The Rapid Equipping Force (REF) program typically uses commercial and field-engineered solutions to meet immedi-

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ate operational needs. REF solutions are then assessed for wider fielding and incorporation into standard acquisition processes.

Support must be flexible.

Rapidly evolving combat situations demand responsive and tailorable solutions. Although quality, well-trained Soldiers able to adapt to the constantly changing demands of the battlefield will always be our most valuable assets, optimum results are generally not gained by depending on our Soldiers' "work-arounds" and "on-the-fly" solutions. The key is to use existing systems in new ways, by applying new ideas and by increasing the dialogue between warfighters and material developers.

Ongoing combat operations, coupled with today's highly fluid environment, require systems and capabilities that can satisfy warfighters' requirements in multiple operational scenarios. This imperative will keep increasing with the requirement of the future force as part of the joint force, according to ***Joint Vision 2010***, "operating unilaterally or in combination with multinational and interagency partners, to defeat any adversary and control any situation across the full range of military operations."

The provision of support within a joint context is an operational imperative. As noted by Vice Admiral Lowell Jacoby, director, Defense Intelligence Agency, "Today, it really does not matter whether targeting data is provided by a Space-based system, a manned or unmanned airborne vehicle or a forward observer working with a U.S. Army or Marine Corps infantry company or small platoons of Afghan national army troops."

An area where we are helping to instill greater flexibility in our support to joint warfighters is the establishment of an organic Space Support Element (SSE) in each of the Army's reorganizing "modular" divisions, the Unit of Employment or UEx. Even now, the first SSE, deployed with the 3rd Infantry Division in Iraq, serves as the focal point for maximizing Space-related capabilities in support of tactical warfighting requirements in concert with the Joint and Interagency and Multinational partners. SMDC/ARSTRAT's involvement in integrating the various Joint Blue Force Situational Awareness (JBFSA) systems to develop a common operating picture will be instrumental in transitioning from standalone, "stovepipe" systems to new concepts of operations that embrace joint force operations and integrated capabilities. This initiative will enhance the flexibility available to warfighters.

Support must be deliverable to Warfighters on the move in an asymmetric environment.

Our future adversaries and concepts of operation to fight them are not like those of the past. More than ever before, joint warfighters will depend on support that lets them pursue the enemy on a 24/7 basis. In the words of President Bush, "When terrorists spend their days struggling to avoid death or capture, they are less capable of arming and training to commit new attacks."

In conventional military operations, enemy forces are generally easier to find than to destroy. Relatively large military formations and their equipment usually operate in terrain conducive to maneuver. They also emit a variety of electro-magnetic signatures subject to interception and have physical attributes that make them visible to detection. Warfighters can then bring together a measured amount of military capability to neutralize or destroy the adversary's combat power. In contrast, insurgents operating as individuals or in small groups in "complex terrain" are often masked in the larger population. They conduct activities by using couriers or move as individuals to avoid ready detection. Identifying and targeting these small groups or individual insurgents — barely distinguishable from the civilian population — presents a distinct challenge.

The new security environment will likely include adversaries who have access to advanced technology, including global communications, Space-based spectral imagery and automation infrastructures. Adversaries may also attempt to get and use weapons of mass destruction (WMD) capabilities. In fact, President Bush has indicated our nation's greatest threat "is the possibility of secret and sudden attack with chemical, biological, radiological or nuclear weapons."

Confronting these evolving challenges will require us to leverage Space-based systems in areas related to persistent surveillance; satellite communications; JBFSA; intelligence, surveillance and reconnaissance (ISR); position, navigation and timing; spectral imagery; missile warning; and Space control.

As recently noted by Under Secretary of the Air Force Peter B. Teets, "Our goal is transparency — we want the ability to see everything and know everything, while simultaneously denying our adversaries both the ability to do the same, and the knowledge that such capabilities are being used against them. We want to be always one step, or more, ahead of our adversaries — to be first to see, first to understand and first to act."

Transformation Realities

What future warfare looks like has been transformed by the nation's and Army's experiences in Afghanistan, Iraq and the ongoing Global War on Terrorism. However, Space-based capabilities will remain essential to future force military operations, and Space operations in support of the future force will remain focused on

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five essential tasks:

- Increased deployability and reduced theater footprint
- Enabling situational understanding en route as well as off the ramp during entry operations
- Support of precision maneuver, fires, sustainment and information on a non-linear battlefield
- Enabling continuous information and decision superiority
- Protecting the force during all phases of the operation

The process of Army Transformation is being subjected to additional realities, including those related to support of extended combat operations in Afghanistan and Iraq. The challenges for Space professionals are in three areas:

- An era of procurement has moved to one of sustainment and replacement. Repair and replacement of equipment subject to heavy use; e.g., HMMWVs, helicopters and tanks, has prompted action on behalf of the Department of Defense (DoD) and Department of the Army to reprioritize plans for current and out-year funding. This trend will likely continue for some time.
- Proliferation of systems is not supportable. Tremendous efforts are being expended to ensure the DoD acquisition and procurement process takes into account the necessity to integrate capabilities in support of joint rather than service-specific requirements. Similarly, future efforts should reduce the adverse impact of multiple "stove-piped" systems, as was the case for the various blue force tracking systems during the initial phases of OIF. Reportedly, more than 20 disparate systems were used in support of the coalition forces.
- Integration timing issues will continue. The Army's future force, fighting as part of the joint force, will be integrated into an overarching information system, a shared comprehensive picture of the battlefield and have global access to users at all levels. In some cases, because of development timing and funding, system integration will take place after the systems are fielded.

Evolution of the Final Frontier — Operations Abound

Recently, GEN Peter J. Schoomaker, Chief of Staff of the Army, noted the extraordinary capabilities provided by the Stryker brigade in Iraq when it "disengaged from combat in the Mosul area, moved 420 miles, fought a battle in Bacava along the way and then entered battle in Najaf. They did all that in a 48-hour period. That performance showed tremendous operational agility and a brigade that is mobile, survivable and very state-of-the-art in terms of communications and command-and-control." This significant feat was enabled through synchronization of multiple capabilities, many of which were facilitated or enhanced by Space-based products and services. Clearly, "the U.S. military cannot undertake any major operation, anywhere in the world, without relying on systems in Space," as was written in February 2001 by the U.S. Commission on National Security/21st Century.

The next several years will be challenging and exciting ones for Space professionals. Operationally, Space is — and will remain — an essential capability that will continue supporting our joint warfighters. Technically, systems with immense potential are being developed and are on the horizon for fielding. Professionally, tremendous opportunities exist for those who are able to leverage and evolve the "Final Frontier" in support of our nation and joint warfighters.

Secure the High Ground!